

# Annual Report 2011



## Production Sector

### Company Information

Company Name: BP  
Gas STAR Contact: Nikhil Shenoi  
Title: HSE Advisor  
Address: 501 WestLake Park Blvd  
P.O.Box 3092 (77253-3092)  
City, State, Zip Code: Houston, TX 77079  
Telephone: (281) 366-2803  
Fax: (281) 366-7945  
E-mail: [shenoin@bp.com](mailto:shenoin@bp.com)

### Annual Report Summary

- ☐ BMP 1: Identify and replace high-bleed pneumatic devices  
☐ BMP 2: Install flash tank separators on glycol dehydrators  
☒ Partner Reported Opportunities (*please specify*):

Green Completions, Automated Shut-in Cycle and Plunger Lift for Well Unloading, "Smart" Automation Well Unloading and Plunger Lift Control, Pneumatic Pump Replacment, Microturbine installations, Green Completion - Reverse Circulation well cleanout

Period covered by report: From: 1/1/2011 To: 12/31/2011

**Partner Signature Required:** I hereby certify the accuracy of the data contained in this report. Nikhil Shenoi

Date: 5/16/11

- Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.
- In addition to reporting methane emissions reductions, you are welcome to include other information about your company's participation in Natural Gas STAR in the "Additional Program Accomplishments" section of this form. The Natural Gas STAR Program will use any information entered in this section to recognize the efforts and accomplishments of outstanding partners.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Partner Reported Opportunities (PROs)

(For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** [Greater Green River Basin of Wyoming \(Wamsutter\)](#)

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Green Completions](#)

Please describe how your company implemented this activity:

[This project is a change in well clean-up and completion procedures to collect and sell gas rather than flaring while cleaning up and flow testing new and recompleted wells. In 2011 the equipment used was changed. Equipment is leased](#)

**C. Level of Implementation** (check one):

- ☐ Number of units installed: \_\_\_\_\_ units  
☐ Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☒ One-year ☐ Multi-year

**If Multi-year:**

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_

[13,054 Mcf](#)

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 10.12 MM](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

☒ Actual field measurement

☒ Other (please specify):

☐ Calculation using manufacturer specifications/other source

[Actual metered flow rates were used with the methane calculated using the EPA's flare efficiency factor of 98% destruction \(2% methane slip, CH4 88.6 mol%\). Actual gas sold rather than flared was 765,550 mcf. This process also eliminated 49,083 tons of CO2 emissions.](#)

**G. Total value of gas saved:** [\\$ 43,862 \(\\$3.36/Mcf\)](#)

Total value of gas saved = Methane emissions reduction (in Mcf) x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

**H. To what extent do you expect to implement this practice next year?** [We have used this practice on most new/recompleted wells in the target fields in 2011.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

#### PRO Comments:

\* Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Partner Reported Opportunities (PROs) (For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

A. Facility/location identifier information: [Wamsutter, Wyoming](#)

B. Activity description: Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Automated Shut-in Cycles and plunger lifts for well unloading](#)

Please describe how your company implemented this activity: [Well venting to unload liquids from well-bores is a significant source of methane emissions. In our Wamsutter field of Wyoming, we begin installing automated shut in cycle units in 2006. These units shut-in wells, based on flow algorithms, to enable pressure build-up and wellbore liquids unloading rather than venting the wells to atmosphere. The well response has been positive and has virtually eliminated venting for liquids unloading on wells equipped thus far. In 2011 we installed 115 shut-in cycles and 29 plungers.](#)

C. Level of Implementation (check one):

- ☒ Number of units installed: [115](#) Units  
☐ Frequency of practice: \_\_\_\_\_ times/year

D. Are emissions reductions a one-year reduction or a multi-year reduction? ☒ One-year ☐ Multi-year  
If Multi-year:

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

E. Methane emissions reduction: \_\_\_\_\_  
[228,250 Mcf](#)

F. Cost summary: Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 768,500](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

☐ Actual field measurement

☒ Other (please specify):

☐ Calculation using manufacturer specifications/other source

[Pressure transient modeling was used to determine the vent rate during well unloading. The reduction is based on change in total venting versus 2005 baseline venting levels prior to installation of the shut-in cycle units. The amount of venting is tracked as minutes and converted to volume. The volume reported is the total reduced in 2011 vs. the baseline prior to project start. The intent is to report total volume annually against the pre project baseline \(2005\). CH4 85.3 mol%](#)

G. Total value of gas saved: [\\$ 766,918 @ \\$3.36](#)

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

H. To what extent do you expect to implement this practice next year? [Total reductions against the baseline prior to project inception will be reported annually. Progress in further reductions will be maintained. The units installed will continue to deliver reductions in future years against the 2005 baseline.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

#### PRO Comments:

\* Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.

### Partner Reported Opportunities (PROs)

(For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** North West New Mexico

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

"Smart" Automation well and plunger controllers to reduce well venting for liquids unloading

Please describe how your company implemented this activity: Well venting to unload liquids from well-bores is identified as a significant source of methane emissions. In our NW New Mexico operations, we began installing "Smart" automation well and plunger system controllers in 2000 with the system becoming operational (phased) in mid 2001. Since becoming fully operational in mid 2002 we have been further improving the control algorithms and optimizing system performance. In mid 2006 we made significant improvement in the well control algorithms and practices which yielded a significant increase in reduction percentage in 2006 and thereafter.

**C. Level of Implementation** (check one):

- ☒ Number of units installed: 2153 units  
☐ Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☒ One-year ☐ Multi-year  
If Multi-year:

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_  
3,428,487 Mcf

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): \$ 12.2 MM (one time cost in 2000-2001)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

☐ Actual field measurement

☐ Other (please specify):

☐ Calculation using manufacturer specifications/other source

Measurement to determine the amount of venting from wells in each producing formation was conducted. The amount of venting is tracked daily, and summed monthly, quarterly and annually. Gas has CH<sub>4</sub> 85.09 mol%. The volume reported is the total reduced in 2011 vs. the baseline prior to project start. The intent is to report total volume annually against the pre project baseline (2000).

**G. Total value of gas saved:** \$ 11.520 MM @ \$3.36

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

**H. To what extent do you expect to implement this practice next year?** Total reductions against the baseline prior to project inception will be reported annually. Progress in further reductions will be maintained.

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)
------	--	--	-------------------------------	-------------------------

**PRO Comments:**



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

\* Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates."

### Partner Reported Opportunities (PROs) (For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** [Moxa Arch Field of Wyoming](#)

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Solar Methanol Pump Replacement](#)

Please describe how your company implemented this activity:

[This project is the replacement of pneumatic gas driven methanol and chemical pumps with solar powered units in our Moxa Arch Field of Wyoming.](#)

**C. Level of Implementation** (check one):

- ☒ Number of units installed: [544](#) Units  
☐ Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☒ One-year ☐ Multi-year  
If Multi-year:

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_  
[18,771 Mcf](#)

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 1.8 MM](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

- ☐ Actual field measurement ☐ Other (please specify):  
☒ Calculation using manufacturer specifications/other source

[Pump curves coupled with methanol use were used to determine the volume saved. Using 5-years of this data an EF was developed for methane reductions/solar pump which was used to estimate emission reductions for the current year. The volumes included are full year. Natural gas has CH4 90.15 mol%](#)

**G. Total value of gas saved:** [\\$ 63,072 @ 3.36](#)

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

**H. To what extent do you expect to implement this practice next year?** [We have replaced all existing pneumatic gas driven pumps with solar powered pumps.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)
------	--	--	-------------------------------	-------------------------

#### PRO Comments:

- Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Partner Reported Opportunities (PROs) (For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** [Moxa Arch Field of Wyoming](#)

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Solar ethylene glycol pump replacement](#)

Please describe how your company implemented this activity:

[This project is the replacement of gas driven diaphragm pumps with solar pumps in our Moxa Arch Field of Wyoming. Ethylene glycol pumps are used for heat tracing.](#)

**C. Level of Implementation** (check one):

- ☒ Number of units installed: [246](#) Units  
☐ Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☒ One-year ☐ Multi-year  
If Multi-year:

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_  
[501,863 Mcf](#)

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 2.467 MM](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

- ☐ Actual field measurement ☐ Other (please specify):  
☒ Calculation using manufacturer specifications/other source

[Solar EG pumps replace diaphragm EG pumps resulting in reduced emissions. Based on measurements from 15 wells and diaphragm pump curves each gas pump uses 6.2 mcf/d \(yearly average\). The volumes included are full year. Natural gas has CH4 90.15 mol%](#)

**G. Total value of gas saved:** [\\$ 1,686,261 @ 3.36](#)

*Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]*

**H. To what extent do you expect to implement this practice next year?** [We are continuing to replace diaphragm gas driven pumps with solar powered pumps. In 2011 we installed 120 additional solar EG systems.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

#### PRO Comments:

- Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.





## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Partner Reported Opportunities (PROs) (For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** [Jonah Field in Wyoming](#)

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Microturbine installation](#)

Please describe how your company implemented this activity:

[Microturbines are used to electrify remote wellsite equipment and replace pneumatic natural gas driven pumps. They use a small amount of fuel gas to generate 20 KW of power to run glycol heat tracing pumps at our Jonah Field in Wyoming.](#)

**C. Level of Implementation** (check one):

☒ Number of units installed: [13](#) Units  
Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☒ One-year ☐ Multi-year  
If Multi-year:

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_  
[70,414 Mcf](#)

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 3.3 MM](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

☐ Actual field measurement

☐ Other (please specify):

☒ Calculation using manufacturer specifications/other source

[13 Microturbines were operational. Each microturbine displaces 2-6 pneumatic pumps. Emission reductions were calculated by subtracting actual fuel used by microturbines from volume of natural gas that would be used by pneumatic pumps for the same number of operating hours. Natural gas has CH4 88.58 mol%](#)

**G. Total value of gas saved:** [\\$ 236,590 @ 3.36](#)

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

**H. To what extent do you expect to implement this practice next year?** [We are continuing our program of installing microturbines at the Jonah field.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

#### PRO Comments:

- Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Partner Reported Opportunities (PROs)

(For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html))

#### Current Year Activities

**A. Facility/location identifier information:** [San Juan Basin of South West Colorado \(San Juan North field\)](#)

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

[Green Completion - Overbalanced Reverse Circulation Cleanout](#)

Please describe how your company implemented this activity:

[This project is a change in well clean-up and completion procedures using an overbalanced cleanout method to eliminate gas migration into the wellbore and venting to the atmosphere during completion of new drilled \(CBM\) wells.](#)

**C. Level of Implementation** (check one):

- ☒ Number of units installed: 7 units  
☐ Frequency of practice: \_\_\_\_\_ times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☐ Multi-year

**If Multi-year:**

- ☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.  
☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** \_\_\_\_\_  
[9,290 Mcf](#)

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): [\\$ 63,000](#)

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

- ☐ Actual field measurement ☒ Other (please specify):  
☐ Calculation using manufacturer specifications/other source

[Estimated vent reduction of approximately 1400 MCF/well. Estimate was developed based on using air \(underbalanced\) to cleanout the wellbore. \(7 days for cleanout/completion using air, 10hr work day, 500 Mcfd average production new well\). Using water \(overbalanced\) for reverse circulation eliminates venting and completion takes 1 day. CH4 94.8% mol](#)

**G. Total value of gas saved:** [\\$ 31,216 \(\\$3.36/Mcf\)](#)

*Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]*

**H. To what extent do you expect to implement this practice next year?** [We plan to continue using this practice to cleanout wells in the San Juan North field.](#)

#### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

#### PRO Comments:

\* Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.





## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Additional Program Accomplishments

The Natural Gas STAR Program will use any information entered here to recognize the efforts and achievements of outstanding partners.

Please include any additional information you would like to share about your company's participation in Natural Gas STAR. Examples may include:

- Activities to strengthen your program (e.g., training/education, innovative technologies or activities, pilot projects, employee incentive programs).
- Efforts to communicate your participation and successes (e.g., internal newsletters, press releases, company Web site).

Participation in Natural Gas STAR program activities (e.g., contributions to case studies, presentation at annual workshop).

Additional Accomplishments:

---

---

**Additional Accomplishments Comments:** *Please use the back of the page for additional space if needed.*



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011 !

### Appendix

#### Methane Emission Reduction Technologies & Practices— Production Sector

The list below describes a variety of methane emission reduction technologies that Natural Gas STAR partners in the production sector have implemented and reported to Natural Gas STAR. You may use this list as a guide when completing your annual report. **Sunset dates (i.e., the length of time a technology or practice can continue to accrue emission reductions after implemented) are one year in duration unless otherwise noted in parentheses.** An asterisk (\*) indicates that a technical document related to the technology or practice is available online at [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html).

##### Compressors/Engines

- Automate compressor systems operation to reduce venting
- Catalytic converter installation (10 years)
- Convert to low pressure compressor starters (10 years)
- Eliminate unnecessary equipment and/or systems\*
- Increase compression capacity to reduce venting/flaring
- Install automated air/fuel ratio controls (10 years)\*
- Install electric compressors (10 years)\*
- Install electric motors (10 years)
- Install electric motor starters (10 years)\*
- Install lean burn compressor (10 years)
- Lower compressor purge pressure for shutdown
- Perform gas recovery using slipstream (10 years)
- Redesign blowdown/alter ESD practices\*
- Reduce emissions when taking compressors offline\*
- Reduce gas venting with fewer compressor engine startups and improved engine ignition\*
- Replace compressor cylinder unloaders (10 years)\*
- Replace gas starters with air or nitrogen (10 years)\*
- Turbine fuel use optimization

##### Dehydrators

- Convert pneumatics to mechanical controls (10 years)\*
- Install condensers on glycol dehydrators (10 years)
- Install flash tank separators on glycol dehydrators (10 years)\*
- Reduce glycol circulation rates in dehydrators\*
- Replacing glycol dehydrators with desiccant dehydrators (10 years)\*
- Reroute dehydrator/tank vents to flare or station suction (10 years)\*
- Reroute glycol skimmer gas\*
- Shutdown glycol dehydrator stripping gas in winter
- Use rich glycol in glycol pumps

##### Directed Inspection and Maintenance

- DI&M at compressor stations\*
- DI&M: leak detection using IR camera/optical imaging\*

- DI&M: leak detection using lower emission threshold
- DI&M: survey and repair leaks\*

##### Pipelines

- Inject blowdown gas into low pressure mains or fuel gas system\*
- Pipeline replacement and repair
- Use hot taps for in-service pipeline connections\*
- Use pipeline pump-down techniques to lower gas line pressure before maintenance\*

##### Pneumatics/Controls

- Capture/use gas released from gas-operated pneumatic pumps
- Convert gas pneumatic controls to instrument air (10 years)\*
- Convert natural gas-driven chemical pumps (10 years)\*
- Convert pneumatics to mechanical controls (10 years)\*
- Identify and replace high-bleed pneumatic devices (7 years)\*
- Install controllers on gas-assisted methanol pump (10 years)
- Install/convert gas powered separators to solar powered separators (10 years)
- Install no bleed controllers (10 years)
- Install non-venting dump controllers (10 years)
- Reduce gas pressure on pneumatic devices
- Reduce venting from unlit pilot: install electronic safety devices (10 years)\*
- Replace bi-directional orifice meter with ultrasonic meters\*
- Replace chemical pumps with electronic flow controllers (10 years)
- Use add-on controls to reduce emissions from pneumatics (10 years)

##### Tanks

- Change out vent pallet (10 years)
- Convert water tank blanket from natural gas to CO<sub>2</sub> (10 years)\*
- Eliminate unnecessary equipment and/or systems\*

## Appendix (continued)

### Tanks

- Install evactors (10 years)
- Install flash gas compressors (10 years)
- Install hydrocarbon liquid stabilizer (10 years)
- Install pressurized storage of condensate (10 years)\*
- Install vapor recovery units (VRUs) on storage tanks (10 years)\*
- Install VRUs on pipeline liquid/condensate tanks (10 years)
- Recover gas during condensate loading\*
- Reduce excess blanket gas blow-by to the atmosphere
- Replace leaking above-ground tanks (10 years)
- Route gas to compressor suction/blowcase vessel (10 years)
- Use protective tank coatings to reduce leaks (10 years)

### Valves

- Heat tracing to prevent control valves from freezing open
- Install BASO® valves (10 years)\*
- Install plugs on valves and open ended lines (10 years)
- Test and repair pressure safety valves\*

### Wells

- Artificial lift: gas lift (10 years)
- Artificial lift: install plunger lifts (10 years)\*
- Artificial lift: install pumpjacks or rod pumps on gas wells (10 years)\*
- Artificial lift: install smart lift automated systems on gas wells (10 years)\*
- Artificial lift: install velocity tubing strings (10 years)\*
- Artificial lift: pressure swabbing
- Artificial lift: use capillary strings (10 years)
- Artificial lift: use compression (10 years)
- Artificial lift: use pumping unit (10 years)
- Artificial lift: use to reduce blowdown in gas wells (10 years)\*
- Install automated shut-in cycle units to reduce well venting (10 years)
- Install flash tank separator on water gathering system (10 years)
- Install pumps for separators (10 years)
- Install snubbing unit at wellhead
- Install soap launcher/soap unit (10 years)
- Lower heater-treater temperature
- Optimize gas well unloading times
- Perform reduced emissions completions for hydraulically fractured natural gas wells\*
- Route casinghead gas to VRU or compressor (10 years)\*
- Use foaming agents to reduce blowdown frequency\*

### Other

- Capture and use waste heat to reduce gas usage and emissions
- Convert natural gas-fired generator to solar power (10 years)
- Flare reduction program
- Improve system design/operation
- Install flares (10 years)\*
- Install pilotless burner controls (10 years)
- Install purge reducer on flare (10 years)
- Nitrogen rejection unit optimization\*
- Recover gas from separators
- Re-inject gas for enhanced oil recovery
- Re-inject gas into crude
- Replace aged heaters with new efficient gas fired heaters (10 years)

***Mailing Information:***

**Standard Mail:**

*The Natural Gas STAR Program  
U.S. EPA (6207J)  
1200 Pennsylvania Ave, NW  
Washington, DC 20460  
U.S.A.*

The public reporting and recordkeeping burden for this collection of information is estimated to average 60 hours for each new response and 27 hours for subsequent responses. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

**Express/Overnight Mail:**

*The Natural Gas STAR Program  
U.S. EPA (6207J)  
1310 L Street, NW  
Washington, DC 20005  
U.S.A.*